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In the Matter of

Advanced Television Systems nd Their Impact on the Existing Television Broadcast Service	)	MM Docket #87-268
Review of Leo Zucker Split 1050 line Orthogonal Polarization TV Broadcasting Concept	)	Patent #5,067,017

TO: The Commission

COMMENTS ON FUTURE IMAGES TODAY HDTV PROPOSAL

Submitted, is a copy of an authored feature article that is scheduled to be published in the September/October 1992 issue of THE SPEC-COM JOURNAL (SCj), an Amateur Radio electronics publication that is read by thousands of hobby electronic experimenters and specialized communication operators here in America and abroad. This article has also been submitted to other similar electronic periodicals.

Amateur Radio operators have long been recognized for their pioneering efforts and inventiveness in early radio and television. I find it quite surprising therefore, to learn about your Advanced TV Testing facilities inability to give a fair shot of consideration and more importantly, actual on-air testing of Zuckers (or any other over-the-air) proposed ideas. Chairman Wiley appears to have already made up ATTC/Cable Labs mind on which proposed systems will work and which proposed system will not work prior to any serious understanding nor testing.

Zuckers dual-image, 6 MHz simple concept is designed to meet original requirements made to the public by the FCC that any new HDTV system be NTSC signal compatible. It could save years of consumer discontent and just might be an answer to a smooth transistion period to a better, more improved, Broadcast TV resolution system. Why is it then, that Chairman Wiley refuses to give it a fair hearing? If the test lab, that the FCC has chosen, is not capable of testing other than Cable-TV compatible systems, isn't it therefore time to choose a more capable testing facility? Could there be a conflict of interest between Wiley, his law firm and the Cable-TV industry?

After studying the Zucker proposal at great length, to me, it seems not only possible but it makes a lot of good sense. I have challenged the Amateur Radio TV community by writing the enclosed article, to take up Zucker's ideas and to build up such systems to see if indeed it could work over greater distances with limited testing equipment. Perhaps the Amateur TV community might be the FCC's best outside, independent, engineering testing source to prove or disprove Zuckers proposal since Chairman Wiley's facility is unfortunately so limited?

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I feel, for Zucker to be given fair consideration, that any such testing results be given directly to FCC officials or someone so designated and bypass Wileys obvious biased testing facility. It would be great to have the Commission officially endorse such testing and in turn, give fair consideration to U.S. Patent #5,067,017 and other such HDTV proposed systems.

I submit my comments regarding Leo Zuckers proposal for consideration.

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THE K2LZ PROPOSED HDTV SYSTEM

Non-Compressed, 1050 Line Scan, NTSC Compatible Idea Is Being Ignored By FCC Advisory Committee!

Relatively Simple FIT Concept Features Orthogonal Polarization and Two Independently Sent 525 Line FSTV Images - U.S. Patent #5,067,017

"EXCLUSIVE" SCj FEATURE ARTICLE

Story Reported by Mike Stone WB0QCD
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Amateur Radio operators started the hobby with spark gap transmitters, then moved to tubes, transistors and integrated circuits. Many HAM experimenters laid out early groundwork for radio and television "sound and image" signals with early broadcast TV stations actually using Ham Radio callsigns to operate "on-the-air"; callsigns like: W2XAX CBS in New York, W6XAO Don Lee Broadcasting System in Los Angeles, W3XE Philco Radio & Television Corp. in Philadelphia, W9XUI University of Iowa, W9XZV Zenith Radio Corp. in Chicago and many others. All stations had HAMS working at them. During World War II, thousands of skilled operators contributed to the knowledge and development of secret radio devices both in governmental and private laboratories. Amateur Radio technicians played key roles in the development of military long-range communications and bomb/missile guidance systems. It was "hams" who pioneered space communications using satellites. More recently, Amateur Radio is continuing to play a significant PUBLIC AWARENESS role in the NASA Space Shuttle program. In the past, our government took serious value in the ideas, workmanship and dedication contributed by Amateur Radio electronic communications "hobby" operators. It is not however, quite clear if past traditions continue on in to the age of the 90's?

Knowing this past history of accomplishments by Hams, it is therefore NOT so surprising to hear that a fellow AMATEUR has patented and proposed to the FCC in Washington, D.C. a very unique idea regarding HIGH DEFINITION TELEVISION (HDTV). What IS surprising is that very few within our personal communications hobby has even heard of the gentlemen and his ideas. Not only have "we hams" not heard about him but it appears that very few in the Broadcast TV industry are aware of his work as well. Why? How could this have happened?

BACKGROUND

The term: High Definition TV (HDTV) was given originally to refer to 525 line NTSC format image pictures that started in the 1950's. 1950 pictures with 525 lines were far superior to those of 240 or a much less amount of lines such as 30-line images transmitted by AM radio stations that were experimented with in 1920's (Nipkow scanning disks). Today, HDTV is being loosely termed for FUTURE TV images of 1,000 lines or more of much higher resolution. It perhaps should be better referred to as: **Super** High Definition Television or SHDTV. HDTV is also referred to as ATV - ADVANCED TELEVISION in the commercial broadcast electronics world (not Amateur TV) and these types of proposed systems have been in the news now for many years.

On Sept 1, 1988, the Federal Communications Commission (FCC) released a Tenative Decision and Further Notice of Inquiry (NOI), FCC 88-288, with respect to an ongoing review of Advanced Television Systems and Their Impact on the Existing Television Broadcast Service (MM Docket No. 87-268). All kinds of individuals, companies, small and large corporations, entities, etc. have entered their ideas on paper to the FCC as to which system they think would be the best way for the USA to enter into employing improved resolution TV images. Submitted schemes range from realtively simple to very complex and expensive solutions. In past SCj articles and in countless broadcast TV magazines, electronic descriptions of several of these proposed systems have been publicized in great detail. That is, all except one. Most all of them, have one, perhaps fatal flaw in common to win over the public's eventual required acceptance of a new TV broadcast system: *THEY ARE NOT NTSC COMPATIBLE.*

Interestingly enough, the FCC "ORIGINALLY" determined that the public would benefit from a terrestial broadcast ATV service, but that most systems currently proposed by industry had one or more of the following disadvantages:

1. Non-compatibility with existing color television receivers manufactured according to the United States 30 frame per second, two-field interlaced scan, 525 line NTSC color standard which was adopted in 1953.

2. A requirement of more than six megahertz bandwidth for transmission of the entire ATV signal.

3. For those proposed ATV systems categorized as compatible with existing receivers, picture resolution is diminished when received on a standard television set, and/or the quality of the picture when reproduced on a HDTV receiver is degraded during movement of the televised image.

On March 21, 1990, the FCC, in many peoples opinions "gave in" and redefined its objectives relaxing simulcast 6 MHz HDTV standards to include for consideration new design principles independent of NTSC standards. Many wondered WHY(?) the original abandonment, some welcomed the openness to investigate other areas and some suspected some upcoming favortism and politics as usual. BIG MONEY speaks or in this case, always gets heard first.

OPINION

Common sense prevails that for American TV consumers and viewers to readily accept any declared HDTV proposal, the system SHOULD be NTSC compatible with existing TV sets now being used. It is hard to imagine for all of us to be told or given a specific deadline by the FCC that on a certain day in the near future - that all present TV sets would no longer be of any use and that we all must therefore purchase $3,000 to $5,000 or whatever high-priced high-definition, digitally processed, color receivers. Nor is it reasonable to assume that Broadcasters will invest heavily into a new HDTV filming system that might only go on-the-air a few hours per evening with a tremendous risk of witnessing such a new system go belly-up in the industry. *Yet, 95% of the proposed submitted systems being made to the FCC demand this type of drastic change.* In the end, as stated in FUTURE IMAGES TODAY (FIT) FCC submission, it must be the PUBLIC who determines a winning, new TV transmission method by either a open vote after witnessing all of the competing systems side by side in a national display, by properly monitored or perhaps independently controlled submitted comments after **on-air** local test broadcasts, etc. *Not only is new TV technology being requested and considered, with any radical new system that is not NTSC compatible, millions and perhaps billions of profitable business dollars are at stake here also which may interfere with an unbiased decision of the best system to go with for the American people.* Therefore, all submitted designs and patents for such systems, given to the FCC for study, testing and evaluation, should identify a disclosure of all entities to whom an interest in the patent right has been assigned. A failure to list such interested persons should negate any FCC consideration of the submitted proposed system. "ALL", regardless of background or stature, should have an equal chance to enter ideas, demonstrate or and have tests done fairly by the Commission. It has been reported that a $200,000 payment is required before testing by the FCC's Advanced Testing Center (ATC). This is downright discriminatory against those inventers who do not have that kind of money. Was such a requirement made of Thomas Alva Edison or other great American and foreign inventors? Where would America (and the world) be if such a monetary imposition would have been implemented on these great individuals?

One Ham's Dream...

WHAT IF someone (a tinkering ham) came up with an unusually simple idea - that no one has ever thought about nor tried before, that, if given a fair shot of consideration, could save the country and the broadcast TV industry millions of product development and research dollars and in turn, keep an NTSC compatible image on the airwaves that EVERYONE could see in either HIGH-DEFINITION or at regular scan rate? You'd think the FCC commissioners in-charge of HDTV studies, the FCC's designated ADV testing center (in Maryland), the entire broadcast TV industry and every TV station and manufacturer in the world would be beating a path to this persons doorstep, would'nt you?

SURPRISE: THERE IS SUCH A PERSON WITH JUST SUCH A NEAT IDEA BUT FOR SOME REASON THE STAMPEDE TO HIS DOOR HASN'T HAPPENED YET.

FUTURE IMAGES TODAY (F.I.T.)

Leo Zucker K2LZ is a quiet, active, Amateur TV operator and Extra Class Ham who lives in Yorktown Heights, NY and works in the White Plains, New York area. He is a highly educated person with a M.S.E.E. and LAW degree. A practicing attorney who specializes in patent and trademark law, Zucker filed his HDTV ideas for U.S. patent on February 13th in 1990. His ideas were patented on November 19th, 1991 - patent #5,067,017 entitled: COMPATIBLE AND SPECTRUM EFFICIENT HIGH DEFINITION TELEVISION. Zucker's ideas and comments have also been proposed to the F.C.C. in Washington, D.C. relating to First Report & Order, MM Docket No. 87-268, FCC 90-295, Released Sep 21, 1990. His submitted documents were made to the Commission on December 20th 1991 via Ray Kowalski, his Washington, D.C. councel.

I, and the rest of the Amateur Radio community at large, did not hear about this proposal until Fred Mia broke the story on the back page cover July 1st issue of W5YI REPORTS and again with a followup story in his July 15th issue (thanks once again Fred!). Upon reading this brief but somewhat detailed accounting of an unfolding saga and finding it of great interest, I immediately dug through an old call book to locate Zuckers address location, called several information operators in New York and eventually got in contact with K2LZ after getting his law practice phone number from Gorden Godfrey, an FCC official to which I remain very grateful.

I have received a copy of the FIT patent paperwork and some copies of FCC written correspondence. Zuckers now patented, NTSC compatible, HDTV plan is basically this:

BLOCK DIAGRAMS PLACED HERE

< Transmit two independent, standard NTSC 525 line, FSTV, 6 MHz emissions in 2-field interlaced signal format ON THE SAME CARRIER FREQUENCY from a specially designed HIGH-RESOLUTION 1050 line interlaced camera or video source using a wobble signal generator (or similar such technique). Each sent image shall encompass ODD and EVEN lines of the total picture information, one set sent HORIZONTALLY and the other set sent VERTICAL to be captured on the receive end with a dual-polarized antenna array that feeds the two signals (two TV antenna inputs) into a newly developed, special combining TV receiver for the final display interwoven, 1050 line HI-RES image. >

Those who will own new future HI-RES TV receivers will enjoy watching a much superior, better, TV picture with twice the present day resolution clarity and detail (1,050 lines). Those who keep viewing with the old, outdated receivers (today's TV sets) will view the same program image at half the resolution (the same image as today's reception) at 525 lines.

The FIT system embodies the concept of orthogonality in wave polarizations similar to what is now being done in satellite downlink transponders. It uses half the frequency spectrum space of other wider band proposed HDTV systems. *Despite it's quite obvious HDTV image advantage, the FIT proposed system also opens possibilities to dual-program or STEREO-TV reception via SIMULCASTING.* Even if the Zucker proposed system does not win final approval, just the idea of it stirs the imagination. Imagine two separate sent TV picture images (with sound) on the same channel receivable by simply switching antenna polarizations. Could it work? Certainly having to purchase a new rooftop (dual-polarized) TV antenna would not only revive the Broadcast TV Antenna Industry but in doing so, it is a far cheaper purchase than being required to buy an expensive new TV set throwing your old ones away!

FROM ZUCKER'S U.S. PATENT ABSTRACT 11/19/91

SYSTEM DESCRIPTION

A spectrum-efficient channel compatible technique of broadcasting and receiving television signals includes generating image signals corresponding to certain parts of an image frame to be transmitted, modulating first image signals corresponding to first contents of the image frame on a first radio frequency (RF) carrier wave signal corresponding to a television channel to produce first RF television signals, and modulating second image signals corresponding to second contents of the image frame on a second RF carrier wave signal corresponding to the television channel to produce second RF television signals. The first RF television signals are radiated from a first antenna having a first polarization, and the second RF television signals are radiated from a second antenna having a second polarization orthogonal to the first polarization. A first tuner/demodulator at a receiver detects the first RF television signals from the first RF carrier wave signal to obtain the second image signals. The tuner/demodulators include circuitry that enables them to discriminate between the two received RF carrier wave signals. The obtained first and second image signals are supplied to a display drive stage that drives an associated display to reproduce the transmitted image frame.

THE MYSTIFYING FCC COVERUP...

You would think that Zucker's ideas on a new, fully compatible, HDTV system (originally sought after by the FCC) would be a system that would be given a fair shake in Washington. Well, it hasn't. In fact, it has been buried and hidden. An investigation into the facts reveals that the FCC's Advisory Committee chairman; Richard Wiley, wrote back to Leo Zucker (after his proposal was submitted) and in a December 21st, 1989 letter on WILEY, REIN and FIELDING corporate stationary, stating that; (2nd paragraph: "all available test slots have been reserved since last September (1989). Therefore, I am unable at this juncture to say when, or if, any newly proposed system could be scheduled for testing." Wiley's letter goes on to say that should a slot opening occur in the near future, that other systems will then be considered. What is really mind boggling is that Chairman Wiley continues; (4th paragraph:) "it is clear that only systems that ATTC/Cable Labs are physically capable of testing will be assigned a slot." The Zucker proposed system is an "on-the-air" dual 6 MHz. type format system not designed to be carried on a standard, single-channel, cable-TV test facility in which the FCC's current testing facility HAS LIMITED ITSELF. *In otherwords, the FCC ATTC/Cable Labs facility in Maryland CANNOT ACTUALLY TEST submitted proposed systems and ideas (regardless of validity of perhaps being the best possible system) with actual "on-air" testing.* How's that for a real CATCH-22 situation?

Gordon Godfrey at the FCC forwarded to Zucker a copy of the Advisory Committee's Third Interim Report. Looking through this report, one notices that Zucker's submitted proposal HDTV system **has been excluded** from an otherwise thorough report on the identity and status of all HDTV systems then before the committee. Why? What is wrong with at least listing everyone's proposals? Have others been excluded as well? Zuckers proposal was submitted to Wiley in

December of 1989.

Wiley's letter to Zucker continues: "The design described in your submission is unique among all known proponent systems in that it uses two multiplexed, orthogonal plane waves operating on the same frequency. Because crosstalk between the cross-polarized signals would appear to be a parameter which limits the detected image quality, an accurate assessment of this design can only be done with an actual over-ther-air test configuration. Unfortunately, the ATTC/Cable Labs test beds have not been designed to perform all tests using an off-the-air channel. Therefore, even if slots which were presently reserved* (Comment 1) should become available, the ATTC/Cable Labs, as presently configured, would not be able to test the system proposed by Carole Broadcasting."

In paragraph 6 of Wiley's letter, he suggests that such a proposed system "might also encounter some practical problems in a real world environment". Wiley states to Zucker to consult with engineers with practical experience with depolarization of propagated TV signals as his system "may not" perform a expected.

[Comments made by the author]

[1] (*) those who have paid $200,000 testing fees

[2] It appears that Chairman Wiley has already passed sentence on Zuckers ideas and proposal without actually doing any sort of preliminary testing or research. Shouldn't the FCC require that its employed testing facility be able to test ALL submitted systems with "on-air" testing?

[3] The fact that the ATTC/Cable Labs is a CATV limited facilty is in itself quite interesting. Does this unusual situation have to do with the desire to keep commercial Cable-TV interests as a key ingredient to future proposals? WHAT IF a submitted "on-air" idea was NOT Cable-TV (single channel) compatible. Would it be thrown out simply because of that? Apparently, as with the Zucker proposal, it will. (Two Cable channels could be used for HDTV signals).

[4] In several July telephone interviews with K2LZ, he stated that he has on several occasions, back-yard tested out his theory (at low-power levels) of being able to transmit and receive two wideband TV signals on one single frequency using separately polarized antennas (in fact it was done in the New York area on 434.0 MHz using a P.C. Electronics exciter with a circuit reputation to be wider in bandwidth than it is suppose to be). Again, this is where perhaps the ATV (Amateur TV) community could come in to play for additional testing.

HELP NEEDED FROM THE AMATEUR TELEVISION COMMUNITY!

Once again, the electronic "under-dog" is challenged to rise above unfounded myths and beliefs. BIG BUSINESS has the bucks behind their ideas and the clout to go with it. There appears to be obvious unfair BIAS at the FCC's testing center, quite questionable test site location and capability limitations and a good question of *conflict of interest* from those in power making decision positions. Maybe Zucker's proposal would not work well as Chairman Wiley has stated. Maybe it would. Maybe it is NOT the best proposed system for the country. Maybe it is. How is the FCC to answer that question if it doesn't give fair consideration and testing to Zuckers proposal against all the other submitted proposals? Hams can help out Leo Zucker K2LZ and the FCC to answer these questions.

I openly challenge at least two Amateur TV operators in every FSTV community within the U.S.A. (one to transmit and one to receive) to take the Leo Zucker K2LZ idea (copies of the entire patented proposal idea are available to the public. Send a legal size, SASE to the U.S. Patent Office or to Mike Donovan KA0JAW at the USATVS or to Leo Zucker K2LZ direct and please mark ZUCKER HDTV PROPOSAL on the front of the envelope). Attempt actual 70 CM. UHF testing under the best possible conditions (don't use "dirty" transmitters and use proper antennas with minimum separation). Call Leo at work or at his home location to discuss with and/or report your progress or findings of your experiments. Document everything you do wether it works or doesn't. Limited "on-air" testing can be done simply by using two FSTV transmitters with crystals on the same operating frequency and by sending two independent TV images (B/W, Color and 4.5 MHz sound subcarriers) from two cameras. AEA or T.D. Systems or WYMAN RESEARCH offer the "cleanest signals". AEA's vestigial sideband XMTRS might be the best to experiment with. How about Don Miller's (W9NTP) low-side injection idea? Try to receive these dual images over a distance of several miles by using one vertical and one horizontal antenna (left versus right handed circular polarization?). View the images on two separate TV's. THINK and EXPERIMENT! Report your results and conclusions to Zucker.

If Leo Zucker K2LZ can demonstrate to the FCC (and to the Broadcast TV industry), that other experimenters around the country using similar testing procedures as has Zucker, have come up with similar confirming results, his proposal might get better recognition. Coordinate your findings closely with K2LZ and send SCj a copy of your test experiments. Who knows what might become of it? You just might play a part in future history of Commercial Broadcast and Amateur TV! Regardless of what the FCC eventually decides, there is nothing that stops Amateur TV operators from further advancing Zuckers proposed ideas into reality.

Meanwhile, I have filed my own personal comments as an interested U.S. citizen, a Broadcast TV consumer, a licensed Amateur Radio operator and as a LIFETIME member of The USATVS with the FCC at their deadline comment date of July 17th, 1992. I am not aware of any other individual or ATV Magazine that has done that at this writing other than the submitted information provided here in SCj. Once again, SCj has first provided you the reader, with this quite interesting story. WB0QCD

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